

REMARKS

Claims 1, 2 and 6-12 are pending in this application. By this Amendment, claims 11 and 12 are added. Support for added claims 11 and 12 can be found, for example, in original claims 1, 3 and 4, and on pages 7 and 8 of the specification. No new matter is added. Claims 3 and 4 are canceled without prejudice to, or disclaimer of, the subject matter recited therein. Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

The Office Action rejects claims 1-4 and 6-10 under 35 U.S.C. §103(a) over U.S. Patent Application Publication No. 2002/0038732 A1 to Sugiura et al. (Sugiura), in view of U.S. Patent No. 7,130,205 to Peng, and further in view of JP-A-2003-235252 to Tsuchiya. The rejection of canceled claims 3 and 4 is moot. The rejection of the remaining claims is respectfully traversed.

Sugiura, Peng, and Tsuchiya, taken in combination, would not have rendered obvious a hybrid fuel cell system, the system including a controller that changes a number of phases of operation of a voltage converter in accordance with a value equivalent to power passing through the voltage converter such that, by changing the number of phases of operation, the controller switches the voltage converter between a single phase drive mode and a multiple phase drive mode, as recited in independent claim 1.

The Office Action acknowledges that neither Sugiura nor Peng discloses a control method of the system incorporating varying the phases. Instead, the Office Action relies on Tsuchiya as allegedly disclosing this feature. However, Tsuchiya fails to overcome the deficiencies of Sugiura and Peng for the following reasons.

First, Tsuchiya fails to disclose that each of the DC-DC converters of Tsuchiya operates at a different phase. Thus, it would not have been obvious to combine Tsuchiya with Sugiura and Peng because, as acknowledged in the Office Action, the converter of Tsuchiya

is far different than a three-phase bridge type converter (see Office Action page 4). However, even if combined with Sugiura and Peng, Tsuchiya fails to overcome the deficiencies.

Tsuchiya discloses a DC-DC converter 3 with a master DC-DC converter 31 and slave DC-DC converters 32 and 33 (see Abstract and Fig. 1). A controller 4 controls the master DC-DC converter 31 and slave DC-DC converters 32 and 33 on the basis of the requested output voltage from an inverter 2, the input/output current voltage information from current/voltage sensors 5 and 6, the battery voltage information, and others (see Abstract and Fig. 1). Tsuchiya discloses that each of the DC-DC converters has a maximum effective output power P_{etamax} (see paragraph [0019]). The controller 4 controls the DC-DC converters based on the demand output voltage from the inverter 2 (see paragraph [0020]). Based on the ratio of the demand output voltage to the maximum effective output power P_{etamax} , Tsuchiya then determines the number N of DC-DC converters required (see paragraph [0024]). However, the controller 4 of Tsuchiya controls the operation of the DC-DC converters based on a desired output, rather than an actual power passing through the converter.

Thus, Tsuchiya fails to overcome the deficiencies of Sugiura and Peng. Accordingly, claim 1 is patentable over Sugiura, Peng and Tsuchiya.

Independent claims 2, 6 and 10 recite similar features as independent claim 1 and are, therefore, also patentable over Sugiura, Peng and Tsuchiya at least for the reasons discussed above with respect to independent claim 1, as well as for the additional features that claims 2, 6 and 10 recite.

Claims 7-9 depend from independent claims 1 and 6 and are, therefore, also patentable over Sugiura, Peng and Tsuchiya at least for the dependence, as well as for the additional features that claims 7-9 recite.

Accordingly, withdrawal of the rejection is respectfully requested.

With respect to added claims 11 and 12, added claims 11 and 12 recite similar features as independent claim 1 and are, therefore, also patentable over Sugiura, Peng and Tsuchiya at least for the reasons discussed above with respect to independent claim 1, as well as for the additional features that claims 11 and 12 recite.

For example, claim 11 recites that "when the equivalent value is smaller than a predetermined value, the number of phases of operation is fewer than the number of phases of operation when the equivalent value is equal to or greater than the predetermined value." This allows an improved efficiency in the conversion (see page 7, line 9 to page 8, line 5 of the specification). Tsuchiya fails to disclose this feature and the resulting benefit.

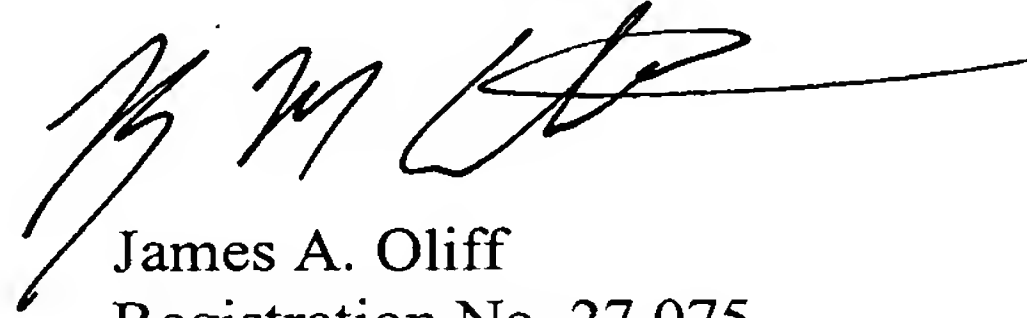
Claim 12 recites that "during the multiple phase drive mode when the equivalent value becomes smaller than a first value, operation is switched to the single phase drive mode, and during the single phase drive mode when the equivalent value is larger than a second value that is larger than the first value, operation is switched to the multiple phase drive mode."

Tsuchiya, on the other hand, discloses that the number N of converters that are used is based on the formula $N = (P_{out}/P_{etamax}) + 1$. Thus, Tsuchiya fails to disclose the features of added claim 12. The features of added claim 12 allow the system to avoid a hunting phenomenon, where the system may become unstable at values close to a changing point (see page 8, lines 6-26 of the specification). However, the apparatus disclosed in Tsuchiya would remain vulnerable to a hunting phenomenon because a single formula is used for both changing from single to plural converters and from plural to single converters. Thus, independent claim 12 also is patentable over the applied references.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 2 and 6-12 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Ryan M. Crockett
Registration No. 62,945

JAO:RMC/jnm

Attachment:
Amendment Transmittal

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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